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Addressing Barriers and Implementing Solutions

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Abstract

At the core, environmental issues like climate change are not primarily technological or economic, but behavioral and cultural. While technological and economic activity may be the direct cause of environmentally destructive behavior, individual beliefs, cultural norms and societal institutions guide the development of that activity. Unfortunately, in addressing environmental problems, we tend to overlook these social dimensions and focus strictly on their technological and economic aspects. We do this in the realm of societal politics, and in the realm of organizational design. This article will redress this lack of attention by considering the social dimensions of a specific issue in the sustainability agenda – climate change. In particular, this article will attend to the social and psychological barriers that exist within individuals and organizations to addressing the issue and offer practical suggestions for overcoming them.

Introduction

At their core, both environmental problems and environmental solutions are organizationally and culturally rooted. While technological and economic activity may be the direct cause of environmentally destructive behavior, individual beliefs, cultural norms and societal institutions guide the development of that activity. The question for any manager seeking to integrate considerations for environmental issues into their organization is – how do I get people to change the way they act and think?

Unfortunately, the present reality is that we tend to overlook the social dimensions of environmental issues and focus strictly on their technological and economic aspects.

Consider the contemporary debate over climate change and its primary focus on a carbon price (whether that is a tax or a tradable permit). As the logic goes; if we set a price for carbon high enough, innovators will create new gadgets that emit fewer greenhouse gases, investors will invest in them, companies will adopt them and consumers will buy them. Contrary to what many would like to think is a quick fix, a price for carbon is but one tool that must be accompanied by others to make sure that markets respond effectively and efficiently. Pricing alone ignores the critical social context.

As an illustrative example, the Irish government instituted a 15 cent tax on plastic grocery bags in 2002. Within one year, plastic grocery bag use dropped by 94 percent. Did pricing induce behavior change? It is part of the story but not the entire story. Unlike the experience in many US cities that are trying to institute similar initiatives (most notably San Francisco), the context in Ireland was ripe for the “plastax.” The reasons, in no particular order, include: there were no plastic bag manufacturers in Ireland to mount an organized opposition; there was no problem of leakage from neighboring countries or states that did not have a similar tax; almost all supermarkets are parts of chains that are highly computerized with cash registers that already collect a national sales tax, so adding the bag tax involved a minimum of reprogramming; people generally didn’t mind paying the tax as the litter from the bags was seen as a common nuisance; and the country has a young, flexible population that has proved to be a good

testing ground for innovation, from cell-phone services to nonsmoking law. As a matter of fact, the country was primed for change having just shifted from the Pound (or Punt) to the Euro. All of these factors led up to the development of a norm that it was socially unacceptable to be seen carrying a plastic bag. It was considered rude, with violators being treated much in the same way as someone who did not curb their dog.

Consideration for the behavioral and cultural dimensions of environmental issues is no less important in organizations. As managers today seek to consider the strategic implications of climate change for their organizations, their focus tends to be primarily centered on carbon accounting. But how do you actually drive deep cultural change within your organization to steer it towards a more creative and, therefore, more innovative approach to dealing with this important issue? This article will consider this question in three parts. First, it will seek to redress this lack of attention by considering the full scope of the cultural shift that climate change places before us. Second, it will outline the form of some of the individual and organizational barriers to cultural and behavioral change. And finally, it will offer some strategies for overcoming these barriers based on the practices of leading firms in this area.

Climate Change as a Cultural Issue

To properly address climate change, we must change the way we structure our organizations and the way we think as individuals. It requires a shift in our values to reflect what scientists have been telling us for years. The certainty of climate change must shift from being that of a “scientific fact” to that of being a “social fact.” To illustrate this point, let me draw on two examples: cigarette smoking and slavery abolition.

Cigarette smoking. For years, the scientific community recognized that the preponderance of epidemiological and mechanistic data pointed to a link between cigarette smoking and cancer. And for years, the general public consciousness ignored that fact. Even today, we still cannot state with scientific certainty that smoking causes lung cancer. The definitive Surgeon General report on the issue states that “statistical

methods cannot establish proof of a casual relationship in an association [between cigarette smoking and lung cancer]. The causal significance of an association is a matter of judgment which goes beyond any statement of statistical probability.” The scientific “proof” of a causal connection between second hand smoke and lung cancer is even more difficult to make. And yet, the general public now accepts belief in both facts. They have become “social facts” and with that shift, action becomes possible. The growing number of smoking bans is predicated on a prudent assessment of the evidence, not on scientifically proved causality. Climate change today still resides in the “pre” social fact phase, awaiting public acceptance. But just how big a shift will this be? To that point, I turn to the abolition of slavery.

Slavery abolition. In short, the magnitude of the cultural and moral shift around climate change is as large as that which accompanied the abolition of slavery. Adam Hochschild, in his book *Bury the Chains*, makes the startling point that in the 18th century more than seventy-five percent of the world’s population was in slavery or serfdom. Humans were a primary source of energy and wealth, particularly for the dominant world power, Great Britain. Hochschild points out that “if you stood on a London street corner and insisted that slavery was morally wrong and should be stopped, nine out of ten listeners would have laughed you off as a crackpot.” It would lead to a collapse of the economy and their way of life. Abolitionism was a challenge to the underlying beliefs upon which the Empire was built. At the time, few people saw a moral problem with this critical institution. People simply did not believe, as we do today, that all people have a right to freedom and equality. Slavery was seen as the natural order of things, unquestioned and even supported by many through the words of the Bible. It took roughly 100 years to abolish slavery in the British Empire, and Hochschild points out that, by the end of the 19th century, slavery was, at least on paper, outlawed almost everywhere.

Now, flash forward to today. We live in a fossil fuel-based economy. Fossil fuels are our primary source of energy and support our entire way of life. As scientific evidence mounts that this critical institution is causing changes to the global climate, we

are faced with a technological and social dilemma. Calls to end our dependence on fossil fuels are being met with the same kind of response as did calls to end our dependence on slavery: such a move would wreck the economy and the way of life that is built upon it. If you stood on a New York City street corner and insisted that burning fossil fuels was morally wrong and should be stopped, listeners would laugh you off as a crackpot. There is a vast physical infrastructure that depends on oil, and it cannot be simply replaced without great disruption. Abolition of the primary source of energy in the world is out of the question, both socially and technologically.

Just as few people saw a moral problem with slavery in the 18th century, few people in the 21st century see a moral problem with the burning of fossil fuels. Will people in 100 years look at us with the same incomprehension we feel toward 18th-century defenders of slavery? If we are to address the problem adequately, the answer to that question must be yes; our common atmosphere will no longer be seen as a free dumping ground for greenhouse gases and other pollutants. But this value shift will require humankind to come to terms with a new cultural reality. The first piece of this reality is that humankind has grown to such numbers and our technologies have grown to such a capacity that we can, and do, alter the Earth's ecological systems on a planetary scale. It is a fundamental shift in the physical order, one never before seen and one that alters the ethics and morals by which we judge our behavior as it relates to the environment around us and to the rest of humanity that depends on that environment.

The second piece of that reality is that we share a collective responsibility and require global cooperation to solve it. The coal burned in Ann Arbor, Shanghai or Moscow has an equal impact on the environment we all share. The kind of cooperation necessary to solve this problem is far beyond anything we, as a species, have ever accomplished before. International treaties to ban land mines or eliminate ozone-depleting substances pale in comparison. Looking at climate change through the parallel of slavery helps us to see the magnitude of the issue before us.

Social and Psychological Barriers within Organizations

Research and experience support the conclusion that there a range of individual and organizational level biases that operate to maintain current behaviors that do not support sustainability. On the individual level, people rely on simplifying strategies in the form of cognitive heuristics or habitual routines in order to function. We are taught to remember the colors of the rainbow using the mnemonic “ROYGBIV” or the notes on a scale using “every good boy does fine.” Poker players follows the heuristic “never play for an inside straight” and mortgage brokers (at least used to) follow the heuristic “people should only spend 35 percent of their income for house expenses.” These heuristics can often be helpful tools for engaging the world on a daily basis, but they can also become a barrier to change as circumstances change. Further, not all heuristics are so explicit, many falling into the category of taken-for-granted cognitive biases. Recognizing them and changing them can be difficult. Similarly, organizations become filters through which the external world is viewed and information is developed, interpreted, disseminated, and acted upon. Just as with individual biases, this filtering process alters rational expectations and perspectives. Examples of dysfunctional and limited cultures have been identified as sources of some of the great failures of organizational decision-making in the past several decades, such as Enron (discussed by Malcolm Gladwell in the *New Yorker* article “Talent Myth”) and the Space Shuttle Challenger explosion (discussed by Diane Vaughan in *The Challenger Launch Decision*).

Taken together, these biases describe the obstacles to people’s rational intentions. Individual managers and employees will resist a growing emphasis on climate change as it pertains to how they do their jobs and why. Overcoming these obstacles will require alterations in organizations to augment the development of new protocols for carbon accounting or economic incentives to reduce emissions. These concurrent efforts must change the culture and values of the organization. These alterations must integrate sustainability concerns into the existing routines by which business strategies are constructed, recasting them in ways that are mutually beneficial to the objectives of individuals, organizations, and the sustainability of the ecosystem on

which they depend. These alterations are as multiple as the biases that resist them. Below, several are addressed.

Educate the workforce. Any effort to address climate change must begin with education. Unfortunately, people today share a relative lack of literacy with regard to environmental issues. Each year, the National Environmental Education and Training Foundation (NEEF), in collaboration with Roper Starch Worldwide, conducts a *National Report Card on Environmental Knowledge, Attitudes and Behaviors*. And each year, the report card finds a persistent pattern of environmental ignorance among the entire public. Some survey results include: “45 million Americans think the ocean is a source of fresh water; 120 million think spray cans still have CFCs in them even though CFCs were banned in 1978; another 120 million people think disposable diapers are the leading problem with landfills when they actually represent about 1% of the problem; and 130 million believe that hydropower is America's top energy source, when it accounts for just 10% of the total. It is also why very few people understand the leading causes of air and water pollution or how they should be addressed.”

Challenge taken-for-granted assumptions. This lack of literacy does not lie only with environmental issues. Many people do not see the economic aspects of these issues, often resisting such knowledge as being counter-intuitive and contrary to taken-for-granted assumptions. For example, many people suffer from belief in the “mythical fixed pie” of the tension between economic and environmental interests. “What is good for one is bad for the other” is an unfortunate assumption on environmental issues like climate change. If you protect the environment it must reduce the economic competitiveness of the firm. And if the firm is growing economically, it must be bad for the environment. The mythical fixed-pie leads to the belief that economic and environmental issues are in a zero-sum relationship. Education must include a challenge to this unquestioned bias. For example, Whirlpool once considered removing the Energy Star® label from its high efficiency appliances when they found that consumers equated lower energy and water use with lower performance. Instead, they embarked on an education program of consumers, retailers and others.

Another example of a taken-for-granted bias that inhibits change, there is an extensive body of research which shows that people use shockingly high discount rates in their consumption behavior. People under-insulate their homes and purchase energy-inefficient appliances, despite the implications for future energy costs. The fact is that many well informed, educated consumers do not take advantage of some of the most simple energy efficiency opportunities – such as energy efficient lighting – which often provide return on investments of 30-50% per year. Many of these consumers would reap greater returns by investing in energy efficiency, rather than their current allocation to stocks, bonds, and money market funds. This problem is related to issues of intergenerational discounting where people discount the future because they can benefit now, despite burdens created for future generations. Again, education must be of a broader focus than simply carbon science and include challenges to the simplifying heuristics that people possess.

Connect to the structure of the organization. The structure of an organization defines its boundaries, rules of interaction, division of responsibilities and patterns of regulated decision flows through which information is passed from one organizational unit to another. These decision flows are not always efficient and tend to distort organizational priorities. As such, they can create communication breakdowns that are often at the center of generating behavior that fails to capitalize on opportunities to address climate change. For example, the federal government and many universities buy or build their buildings with one budget and operate them with another. Any up-front cost increases may be rejected despite their potential for minimizing operating expenses and yielding short payback horizons because the department that reaps a long-term benefit is not the one that paid the up-front cost. Breaking down the boundaries between organizational silos can be accomplished through new cross-functional teams that bring together a diverse set of players for both a more comprehensive set of responses.

Connect to the culture of the organization. Environmental issues, like climate change, can trigger deep emotional responses within individuals and organizations. To

some, the term environmentalism is akin to polarizing and charged terminology like liberal, political correctness, or left-leaning. This can create resistance to change. In surveys, researchers have found that some people are turned off by the phrase “green building” and are much more engaged by terms like “smart building” or “high performance” building. Adoption of new practices is easier if framed in a way that fits with pre-existing organizational routines. Instead of greenhouse gas reductions, companies may find greater acceptance if they use terms like operational efficiency, consumer demand, or risk reduction. In this way, environmental issues are translated into terminology that reflects the deeper underlying values of the organization; it is already understood and for which a vocabulary and structure exists. Invoking such language and terminology can be critical in setting the much needed sense of urgency that is necessary for any change effort to succeed.

Engage senior leadership. A critical part of the culture is, of course, senior leadership. The top management team sets the strategy of the organization and embodies its culture. If the senior leaders do not support a climate change initiative, then it will likely fail.

Connect to the metrics of the organization. As part of the language and terminology of the organization, the metrics used to discuss and promote certain initiatives may restrict the shift in technologies necessary for addressing climate change. Net Present Value, Return on Investment or Gross Domestic Product are all terms that represent deeper institutional logics. For example, the Gross Domestic Product (GDP) is the foremost economic indicator of national economic progress. It is a measure of all financial transactions for products and services, but it does not acknowledge (nor value) a distinction between those transactions that add to the well-being of a country and those which actually diminish it. Any productive activity in which money changes hands will register as GDP growth. This creates perverse economic signals that promote short-sighted economic activity at the expense of environmental objectives. For example, GDP increases with polluting activities and then again with pollution clean-up. Economic activity and GDP have increased through the low cost and socially inappropriate disposal

of hazardous wastes. Then money spent to clean those waste sites is again added to GDP. As a result, pollution becomes a double benefit for the economy and the true relationship between economics and the environment becomes clouded.

Oftentimes, addressing climate change may require new kinds of metrics to represent new considerations for previously accepted behaviors. For example, consider that the standard terminology for identifying incandescent light bulbs is based on wattage. We buy a 75 watt or 100 watt bulb, using energy consumption as proxy for the amount of light produced. But this terminology is completely inappropriate for new lighting technologies such as compact fluorescent lighting (CFL) and light emitting diodes (LED). The wattage of these light sources is significantly lower than incandescents, and output must be measured in lumens—a term unfamiliar to most consumers—which describes actual light output. Further, these new technologies require an understanding of light quality as well, something that consumers rarely considered with incandescents. This consideration involves the “color rendering index” (CRI) and “color temperature” of a light source (measured in degrees Kelvin).

Connect to the reward structures. Rewards become the central focus of any efforts to address climate change. These may take the form of both formal and informal signals, at times being ambiguous or conflicting. Many companies have hoped to foster improved environmental performance through the establishment of highly publicized environmental programs endorsed by top-level speeches, only to watch them fail because they did not align the reward structures properly. In one example, a refinery manager quipped that his responsibilities were to protect the environment, maintain safety, and increase process yield. But when it came time for promotions, they “skipped the first two and went straight to the third.” As a result, reward systems and not corporate policy guided his behavior. Very often, organizational psychologists look first at rewards when diagnosing dysfunctional behaviors. Steven Kerr calls it the “folly of rewarding A while hoping for B.” Old rewards systems that support unsustainable behavior must be replaced by new reward systems that incent new objectives.

Recognize the threat that change creates. There are some very strong motivations for people to resist change for very personal reasons. For example, addressing climate change can threaten established power bases and personal interests. When introducing considerations for addressing climate change, the question must be asked: Who gains and who loses? In the construction of a new building, for example, does the addition of this new skill set around green construction fall to the architect, contractor, engineer, or a new green or integrative design consultant? Existing participants in building design and construction may resist these changes in order to defend their professional jurisdiction. And even if a change in the organization does not threaten the established political order (although few changes are politically inert), people may still resist because of fear of the unknown or defensive perception. People automatically assume that change will be painful, costly, difficult or be accompanied by some kind of loss, whether that loss is in the form of familiar routines, established rewards, or expected competencies for success within the workplace. Gaining the buy-in of critical constituents in the organization, those who are necessary for any effort to go forward must be a priority of any organizational change effort.

Address external restraints. All efforts to address the necessary culture shift lie within the organization. Corporations exist within a broader social and economic context, one whose constituents can have a great effect on the success or failure of any initiative. These constituents include the government, trade associations, non-governmental organizations, consumers and others. On climate change, the government is poised to play a profound role in altering the marketplace for greenhouse gases (GHGs). But, the form of those regulations has yet to be determined. Researchers have shown that legal standards, once set, become an independent force, taking on a life of their own — leaving rationality, innovativeness, and societal interests behind. They suggest that sub-optimal outcomes can result from an adherence to standards and that this sub-optimality is due to a tendency for standards to direct attention toward the law itself and away from the purpose behind the law. As a result, decision makers may

be led to evaluate sub-optimal choices that adhere to a standard more highly than optimal choices that violate the standard.

Once standards are written, program managers within both government and corporations often become constrained by rigid rules which preclude the search for creative solutions to complex environmental problems. Sub-optimal outcomes are the product of both unintentional and intentional actions on the part of the decision maker. Unintentional actions may result from individuals “just following the rules,” creativity not being rewarded, a “use it or lose it” rationale, intrinsic motivation being replaced with extrinsic motivation, or a “no law against it” mentality. Intentional actions include trying to “beat the system.” Therefore, any efforts to integrate climate change into the organization must be augmented by efforts to alter the external environment through government lobbying, trade association engagement, etc.

In the end, the obstacles to change just listed point to the notion that people are “cognitive misers,” resisting change and preferring to limit the amount of thinking necessary to change what were previously automatic decisions. Consider the consumer who is able to navigate the hundreds of familiar offerings in the cereal aisle of a standard grocery store. The first time that consumer faces hundreds of *unfamiliar* offerings in the cereal aisle of an organic food store; he becomes crippled at the analysis now necessary in what was previously an automatic decision. These decisions become even more challenging when new choice parameters are introduced. Which is better for the environment – paper or plastic packaging bags, disposable or washable diapers? Any effort at organizational change must be comprehensive, offering new technological and economic structures for addressing climate change, but augmenting those structures with programs to alter the organizational culture and individual values of its members. In short, we must recognize that people are “boundedly rational.” Many companies have undertaken such efforts in seeking to address these considerations. The next section will summarize those efforts.

A Framework for Addressing Climate Change

Addressing and overcoming the biases just discussed cannot be conducted in a piecemeal fashion. A manager cannot simply pick a single bias and institute a single policy to address it. The solutions to climate change within the organization must emerge from an alteration of the organizational system, reaching deep into the levels of the core beliefs and values that members hold toward the relationship among the organization, the market and the natural environment. It involves the unlearning of what has been ingrained. Assumptions, heuristics, norms, and beliefs that have been established within individuals and organizations must be challenged and, where necessary, reset to reflect new perspectives. Attention must be paid to altering the structures for decision-making throughout the organization, recognizing that change in one part of the system has effects in other parts of the system. .

What follows is a detailed and structured approach for integrating climate change considerations into the organization based on a Pew Center study – *Getting Ahead of the Curve: Corporate Strategies that Address Climate Change* – of leading companies that have made proactive steps to address the climate change issue through a reduction in their GHG emissions. Summarized in Table 1, this model follows eight specific steps clustered into three stages that describe the various components of a climate-related strategy. Stage 1 creates the rational and logical foundation for setting a strategy for reducing greenhouse gas emissions. Stages 2 and 3 address the individual and cultural aspects that make that strategy a success.

Insert Table 1 about here

Stage 1: Develop a Climate Strategy

Overall, this first stage of developing a climate strategy involves gathering the information to be taught to employees that connect business strategy and greenhouse gas reductions.

Step I: Conduct an Emissions Profile Assessment. The first step in developing a climate strategy is to develop an understanding of what climate change means for the organization in order to educate the workforce. It involves an analysis of a company's GHG emissions profile throughout the value chain. This is a fundamental starting point for identifying and prioritizing emissions reduction options, the means to reduce emissions, products and services that may be affected by legally binding carbon constraints, and potential strategies that are complementary to the core business. To identify sources, types, and magnitude of emissions, as well as the vulnerability of business lines, employees need a basic awareness of the tools and protocols available to gather such information.

The World Resources Institute/World Business Council on Sustainable Development (WRI/WBCSD) Greenhouse Gas Protocol Corporate Accounting and Reporting Standard developed a step-by-step guide for quantifying GHG emissions and is used as the starting point for most reporting efforts around the world. Companies can do a Scope 1, Scope 2, or Scope 3 inventory. Scope 1 includes direct emissions; Scope 2 includes indirect emissions from the consumption of purchased electricity, heat, or steam; and Scope 3 includes other indirect emissions from upstream and downstream sources, as well as emissions associated with outsourced or contract manufacturing, leases, or franchises not included in Scope 1 or Scope 2.

Most companies measure scope 1 direct emissions -- those from sources owned by the reporting company and generally include emissions from on-site production processes and from the direct combustion of fossil fuels in boilers and furnaces, and for on-site power generation -- but other companies' measure scope 2 and 3 indirect emissions that yield interesting conclusions. Whirlpool, for example, measured the indirect emissions from the use of its home-appliance products and found that these emissions constitute 93 percent of the company's GHG profile and must be the primary focus of reduction efforts.

A small number of companies (such as IBM, Interface, and several financial-services firms) accounted for emissions from material transport, business travel, and

commuting. Swiss Re, for example, generated 43 percent of its emissions profile from business travel (direct emissions and indirect office electricity use account for the remaining 13 and 44 percent, respectively).

Step II: Gauge Risks and Opportunities. Emissions alone do not reveal a company's exposure to carbon constraints. Emissions must then be connected to the business strategy by considering potential impacts on product and service lines. The next step in climate-strategy development is consideration for how operations and sales may be affected – both for the positive and the negative – by climate change-related factors and, as a result, how such factors may alter competitive positioning. As part of this analysis, companies should consider their emissions profile relative to industry peers, the industry's position relative to other sectors, potentially relevant future regulatory developments, trends in input costs, and potential changes in customer preferences. Identifying risks and opportunities must flow from an understanding of the company's current and future GHG footprint in the context of a current and future carbon constrained society and economy.

Shell provided a classic example of the sense of business urgency that GHG constraints can create. The company's operations, and more importantly its products, are squarely in the middle of the climate debate. In 2005, Shell's own operations emitted 105 million metric tons of CO₂e (CO₂e is a composite index of all GHG emissions), while downstream combustion of the fossil fuels it produces generated another 763 million metric tons. Together these emissions accounted for some 3.6 percent of global CO₂ emissions from fossil-fuel combustion. This fact drove the company to consider climate change as a significant business issue.

Once framed as a business issue, risk management can give way to emphasizing business opportunities and top-line enhancements created by climate change. To fully connect business strategy and climate change, companies need to assess whether and how demand for their current and future product and service lines may be enhanced by climate-related developments.

Alcoa, for example, found that future climate policies may create market opportunities by expanding aluminum recycling. Considering that aluminum produced from recycled materials requires only five percent of the energy needed to make primary aluminum and that energy prices will likely rise from carbon constraints, the company pledged that 50 percent of its products, other than raw ingot sold to others, would come from recycled aluminum by 2020. Increasing recycling rates was among the more significant long-term strategic opportunities for the company. Another was the expected boost in demand for aluminum as a material in lighter weight vehicles, and the company is continuing to make progress into this area. According to the company, a 10 percent reduction in vehicle weight typically yields a 7 percent reduction in GHG emissions.

But, going even further, some companies have focused their energy and efforts into fundamental technology and cultural shifts of their organization. DuPont, for example, has identified the most promising growth markets in moving away from fossil fuels and towards the use of biomass feedstocks that can be used to create new bio-based materials such as polymers, fuels and chemicals, new applied Biosurfaces, and new Biomedical materials. According to Uma Chowdhry, Vice President of Central Research and Development at DuPont,¹ this is not a subtle shift, but rather a significant change in product lines, research focus and culture for DuPont. She hoped that DuPont would eventually be known for leading the industrial biotechnology revolution and predicted that over 60 percent of DuPont's business would stem from the use of biology to reduce fossil fuels by 2030.

Step III: Evaluate Options. After developing an emissions profile, the next task is to evaluate options for reducing emissions. This step is often conducted in an iterative fashion with goal setting. Some companies set goals and then search for ways to achieve them. Others consider their options for reducing emissions and then set goals accordingly. The precise ordering is a matter of individual management style.

¹ All interviews were conducted in 2005 and 2006, some people may have changed jobs or retired since that time.

Many companies were able to identify a variety of low-cost options for reducing their GHG emissions. These “low-hanging fruit” opportunities often include behavioral or technological changes that challenge taken-for-granted assumptions and improve efficiency and reduce energy consumption. For example, the first step in Swiss Re’s three-tiered approach to reducing GHG emissions involved turning down heating and cooling in company offices, and turning off lighting systems during non-working hours, something that was never considered before. As a second step, the company focused on small investments, such as motion sensors and compact fluorescent light-bulbs, and on reducing emissions from business travel by curtailing short-distance trips for internal meetings and by providing employees with the latest telephone or video conferencing technology. The final tier of Swiss Re’s approach involved refurbishing company-owned property and buildings by, for example, replacing cooling towers, generators, insulation, or windows. Andreas Schlaepfer, Head of Internal Environmental Management at Swiss Re, believed that for non-manufacturing companies like Swiss Re, substantial reductions from building-related conservation efforts are quite easy: “If you’ve never focused on energy efficiency before, achieving a 30 percent reduction is simple.”

A few companies developed breakthrough technology solutions that facilitated a dramatic reduction in their GHG footprint. Such “silver bullet” opportunities are often the focus of new technology development but have also been realized in existing operations. For example, Shell managed a sizable portion of its pre-2002 emissions by reducing the venting of associated gas (methane) from its exploration and production facilities, again a solution that had been overlooked before GHGs became a business issue.

One problem with overcoming habitual routines and taken-for-granted assumptions in climate-related strategies is that new ideas must compete with other initiatives for funding through standard funding metrics and evaluation processes. According to John Carberry, Director of Environmental Technology at DuPont, capital investments to reduce energy consumption often meet resistance because they are not viewed as “sexy” or compelling. “The problem is that when we pitch 20 percent return

with 99 percent certainty on energy, we lose to a marketing group pitch of 40 percent return with 60 percent certainty,” says Carberry.

Step IV: Set Goals and Targets. A company’s motivations for taking action are influenced strongly by corporate history and culture, core competencies, or the competitive environment. Shell had been watching the climate change issue since the early 1990s through its Issues Management Team within Corporate Affairs. In 1998, Jeroen van der Veer (then Group Managing Director) championed a more formal study of climate change and its potential impact on the company’s businesses globally. DuPont’s actions were foreshadowed by its experience with stratospheric ozone depletion in the 1970s and 1980s and the impact that the Montreal Protocol (the treaty that constrained CFC production) had on a major company product line. When the Intergovernmental Panel on Climate Change (IPCC) issued its first assessment report in 1990, DuPont’s (then) CEO Ed Woolard saw a familiar scenario playing out and directed the company to become an early adopter of GHG reductions.

As befitting their cultures, companies have made a wide range of commitments to reduce GHG emissions, the specifics of which differ in such aspects as timetable, objectives, baseline year, and types of emissions covered. For example, DuPont’s goal in of reducing GHG emissions 40 percent below 1990 levels by the year 2000 was set in 1994. That target was met in 1999 and the company established a new goal to reduce net GHG emissions 65 percent below 1990 levels by 2010. Whirlpool’s target, set in 2003, called for reducing total GHG emissions from global manufacturing, product use, and disposal by 3 percent from a 1998 baseline by 2008, while also increasing sales by 40 percent over the same period.

But again, befitting specific cultural contexts, goals and targets need not be limited to GHG reductions but can include strategic initiatives and adaptation strategies. Swiss Re, for example, committed to increase the renewable share of its energy purchases from 14 percent in 2005 to 37 percent in 2006 and 50 percent in 2007. DuPont set three additional climate-related goals as part of its sustainable growth initiative, including a commitment to hold energy consumption to 1990 levels, source 10

percent of that consumption from renewable sources at cost-competitive rates, and receive 25 percent of the company's revenue from non-depletable resources by 2010.

Most companies established short- and long-term goals in an iterative fashion and in a way that is aligned with their strategic objectives. Several companies solicited opinions from individual business units but then pushed further, creating a stretch goal to make significant progress. In fact, for many companies, stretch goals were critical if you were going to create real culture change. Craig Heinrich, leader of the global energy team for DuPont's Titanium Technologies division explained, "You need the tension of a very challenging goal. Inspirational goals call an organization to act beyond conventional boundaries...An easy goal fails to challenge the creative potential of the organization."

Stage 2: Focus Inward

Once a climate strategy is developed, the second stage involves integrating climate goals and targets inside the organization by developing supportive structural mechanisms and by engaging employees.

Step V: Develop Financial Mechanisms to Support Climate Programs. Absent legal mandates, most companies are currently using internal pricing mechanisms to support their GHG-reduction efforts, including special pools of capital (47 percent of those surveyed), lowered internal hurdle rates (32 percent), and internal shadow prices (33 percent) for carbon. Most companies use a combination of approaches to fund their climate-related strategies and evaluate prospective investments.

The precise numbers and formulas companies use for shadow pricing or internal hurdle rates are generally considered proprietary for strategic reasons. For example, Shell uses three different internal shadow prices for carbon: one for the E.U., a second for other developed countries, and a third for the developing world. With these shadow prices, Shell requires that energy efficiency and GHG-reduction projects meet the same internal hurdle rate as other investments. Such internal mechanisms become redundant as mandatory carbon regimes create a real external market price in some locations. By way of illustration, David Hone, Group Climate Change Advisor at Shell explained how

the value of carbon could be a significant driver in energy-efficiency decisions: One barrel of oil produces about 0.36 tons of CO₂. An E.U. Emission Trading Scheme (ETS) CO₂ price of €25 is like adding a further \$11 per barrel to the price of oil, which makes an energy-saving project even more compelling. The company used long-term premise values for both oil and carbon when valuing internal efficiency projects (the actual numbers used by Shell are confidential and change with the market).

Expertise and knowledge gained by developing these mechanisms can help companies understand when climate programs make sense only with an external carbon price and when they can be sustained without one. According to Vince Van Son, Manager of Environmental Finance and Business Development at Alcoa, “Just as every piece of fruit ripens at a different time, not all projects should be pursued immediately. The process starts with quality information.”

Step V: Engage the Organization. Employee buy-in is crucial to the success of any climate-related strategy. As Alcoa’s Van Son explained, “Our people link our systems and our success. The best technology only gets you so far. Employees will devise innovative ways to achieve clearly stated goals when they understand the linkage with the company’s vision and values.” The components of gaining buy-in include educating the workforce by linking climate change to the dominant metrics, language and reward structures of the organization, making sure that senior leadership is visibly supportive of the efforts, identifying sources of organizational resistance and support and developing specialized teams that bring the issue into the core of the organization’s priorities.

To begin, educating the workforce can be challenging. According to Tim Higgs, Environmental Engineer in the Corporate Environmental Department at Intel, “Climate change is a more difficult subject to convey to management due to the complexity and scope of the issue and the relatively tiny impact of an individual corporation. Other environmental issues are often more acute and therefore easier to drive understanding on why the company should take action.” Companies that have struggled to generate internal support for GHG reductions emphasized the importance of an effective, easily understandable communication strategy. “When you talk about trading, impact on

energy and economics, you need something besides words. It's hard stuff," stated Kevin Leahy, General Manager of Environmental Economics and Finance at Cinergy (now Duke Energy). Knowing the audience is critical. "You need to ease people into the discussion. Link it to what they already know is possible. For us, it was our experience with cap-and-trade in our acid-rain program." Whirlpool tied climate change to long-standing company priorities and even refrains from using the term "climate change" in internal discussions, preferring instead to employ the more familiar terminology of energy efficiency. "We've got a train moving on efficiency," explained Mark Dahmer, Director of the Laundry Technology Division at Whirlpool. "We'd just start confusing things if we tried to start a new train."

Beyond framing, companies have used traditional and innovative programs to build internal awareness and incentives. Rewards and public recognition were common methods of creating buy-in for corporate initiatives. DuPont, for example, tied related performance metrics to employee bonuses and has created an award program that recognizes exceptional environmental achievements throughout the company. Alcoa purchased trees from local suppliers and distributes them to employees who are then encouraged to plant them in their communities or on Alcoa property. As of 2005, 1.5 million trees had been planted toward the company's goal of planting 10 million trees by 2020. The company also encouraged employees to participate in local and regional programs like Smart Trips to increase the use of public transportation and reduce their personal carbon footprint. Swiss Re hosted a wide variety of internal marketing events, including on-site demonstrations that allow employees to test-drive hybrid vehicles.

Other companies provided incentives for purchasing hybrid cars. Google offered its full-time U.S.-based employees a \$5,000 subsidy toward the purchase of a vehicle with an EPA fuel economy rating of 45 mpg or higher; Integrated Archive Systems offered a \$10,000 subsidy. Such programs make the climate issue more tangible to people and connect it to their daily lives, while offering examples of how they can make a difference.

While engaging the workforce is important, companies note that senior-level leadership, support and engagement were the most critical components of any successful climate strategy. In the words of Pat Atkins, Alcoa's Director of Energy Innovation, "On a scale of one to ten, senior-level support is an eleven." Melissa Lavinson, Director of Federal Government Relations at PG&E, added that, "It is critical to have buy-in at the highest levels and to have the commitment of senior management. It is also important that the Board of Directors understand the business impacts, and opportunities, associated with addressing climate change."

Senior leadership can demonstrate a commitment to addressing climate change in many ways. For example, when business units in DuPont were reluctant to push hard to reach the company's first round of GHG-reduction goals, CEO Chad Holliday stepped in personally to emphasize that failure was unacceptable. His commitment was cited by employees as critical to DuPont's early success. Similarly, Alcoa credits former CEO Paul O'Neill with asking the right questions and challenging engineers to improve the smelting process. Other CEOs, such as Duke Energy's Jim Rogers, have been visible spokesmen at Congressional hearings and in the press. And (former) Wal-Mart CEO Lee Scott received considerable attention for the more environmentally sustainable path his company is taking.

In contrast to other companies studied, the impetus to address GHG emissions at Whirlpool did not come from the CEO's office. JB Hoyt, Director of Regulatory and State Government Relations, admitted that top-down leadership would have been important if the company were starting from scratch, but felt there was no need to push a new mindset given Whirlpool's historic focus on energy efficiency.

And this point leads to an important consideration within the company. When initiating change within any company, climate-related or otherwise, the first questions are: Who will be for it? And who will be against? The great majority (90 percent) of survey respondents identified their EHS department as an initial champion of climate action. Sixty-six percent also identified the CEO and the management team. Then, survey respondents ranked the accounting, finance, and marketing departments as

among the least involved in developing and adopting climate programs, while departments responsible for corporate strategy were considered only moderately involved. Ultimately, breaking down internal resistance is critical to success. Survey respondents identified four main strategies for doing this: establish a clear link between the climate-related strategy and company values, demonstrate clear CEO commitment, create a robust business case for climate-related initiatives, and educate the workforce.

All companies studied described how climate change began as an endeavor within EHS but diffused from the periphery to the core and, in the process, became an issue of strategic importance to the company. To accomplish this goal, some companies developed new teams to identify and implement climate-related strategies; such teams may be cross-functional or may have particular expertise and be devoted to a narrow goal.

Whirlpool, for example, first began attending to climate change in the same way it addressed other environmental issues: through the company's Environmental Council, a group comprised of representatives from its six geographically dispersed business units. Similarly, Interface's Global Sustainability Council was a cross-functional team that looked at climate change and other pertinent issues from a wide variety of perspectives including product development, life cycle assessments, business development, public relations, sustainable operations and reporting, and EHS.

Once on the agenda, companies often developed new teams to focus on climate strategies. For example, Alcoa launched a Corporate Climate Change Strategy Team directed by top executives and comprised of 11 members representing operations, government affairs, technology, communications, and finance and with geographic representation from the United States, Canada, Australia, Europe, and Brazil. According to Randy Overbey, President of Primary Metals Development, the secret to the team's success was its multi-functional membership: "The members may not always agree with each other, but having such diverse representation increases the robustness of our results."

Other companies organized specialized teams. Cinergy (now Duke), for example, developed a GHG Management Committee to oversee the allocation of its \$21 million GHG fund. The committee included ten senior representatives from business areas that would be affected by GHG policy and one ex-officio NGO member, Environmental Defense. Similarly, Shell created a new unit, led by senior executive Graeme Sweeney, to kick-start and foster GHG-reduction technologies until they were sufficiently integrated into the company's business units to stand on their own.

Many companies also had groups that explicitly looked for energy-efficiency opportunities. DuPont had a purposed Energy Competence Center, while Shell had the Energise group within its Global Solutions internal consulting arm. Each team was slightly different in structure, but all included technical experts drawn from both corporate and local-business-unit levels. Alcoa's Energy Efficiency Network augmented internal personnel with external experts. In each case, these groups deployed teams at the request of unit managers and performed audits to recommend operational, equipment and behavioral changes (the decision to implement is typically left to site managers). They also identified, documented, and disseminated information about successful energy practices observed at plant locations.

Ultimately, the goal is to develop specific expertise but then integrate that expertise into existing organizational structures. At Shell for example, company-wide internal trading began with the Health, Safety & Environment (HSE) group within Corporate Affairs. It was then moved to Shell Trading with the creation of a CO₂ trading desk to allow the company to participate in the Danish and U.K. ETS's. "GHG is becoming more and more internalized," stated Shell's Hone, adding, "While we are still learning, it is clear that climate change has to be imbedded in the real business strategy early on and not just remain an HSE issue."

A similar process occurred at Swiss Re, which created a Greenhouse Gas Risk Solutions (GHGRS) department. The group was dissolved in the summer of 2005 and its mature offerings, including carbon trading, insurance products, and weather derivatives, were redistributed to mainline product groups. A centralized logistics department was

created to oversee office-space management and carbon neutrality. By successfully integrating its climate activities with its various mainline businesses, such as Capital Markets and Advisory (trading products), Risk Awareness (D&O insurance) and Carbon/Clean Energy Asset Management, Swiss Re could more effectively engage climate change as a strategic bottom-line issue going forward.

Stage 3: Focus Outward

This stage of climate-strategy development involves engaging important external constituencies that directly impact strategic success.

Step VII: Formulate a Policy Strategy. Since regulatory policy (national and international) will be one of the strongest drivers for mandatory change within corporations, companies must be aware of the policy options being considered and decide which would most benefit their own business strategy. Ideally, companies will want to gain a seat at the table when future regulations are designed and influence their final form. Duke Energy's Rogers felt that involvement with government was necessary to avoid "stroke of the pen risk, the risk that a regulator or Congressman signing a law can change the value of our assets overnight. If there is a high probability that there will be regulation, you try to position yourself to influence the outcome." Shell's Hone stated plainly, "If you're doing a deal with somebody and they're setting the rules, then you want to have a say."

Despite little progress toward national GHG regulations, all survey respondents believed that government involvement was necessary to address climate change and that it is coming. According to Yolanda Pagano, Director of Climate Strategy and Programs at Exelon, "We believe that leading companies will do what they can do in advance of mandatory programs, but we believe that to go beyond the base level of effort that is occurring in the voluntary period and to make significant progress in addressing this global issue, government mandates will be required." Duke's Leahy added, "The technologies will emerge when CO₂ has a price signal, and that market signal will be created by regulation....What is important is that lawmakers know that

even some coal-fired utilities think it is possible to deal with the climate problem without harming the economy.”

Step VIII: Manage External Relations. One final component of a successful climate strategy is engaging external constituents, beyond the government, that are critical to the success of any internal initiative. Companies stated that external outreach efforts are aimed first at employees (a somewhat counter-intuitive finding) and NGOs, followed by government, the broader public, and investors. Each represented a different audience and required a different form of outreach.

According to Ruksana Mirza, Vice President of Environmental Affairs at Holcim, her company reported information publicly “to establish to our employees, the communities in which we operate, customers, investors, and governments that we recognize this as a significant environmental aspect of our operations, and that we are taking action to address it.” For Interface Research Corporation, President Mike Bertolucci believed the company’s public outreach strategy helped it become “internationally recognized as a sustainability leader.” At Shell, the company’s annual *Sustainability Report* served three purposes: to present the company’s public face and report its activities to the outside world, to give staff and different business units a guiding vision, and to allow those units to communicate concerns and ideas during the process of compiling the *Report*.

Not all external stakeholders supported corporate action on climate; indeed 43 percent of companies studied reported encountering external resistance. Of this group, 82 percent cited regulators as a barrier, with some pointing to the lack of clear climate policy as an obstacle. Similarly, according to the consulting firm Deloitte, some executives in the power and utility sector stated “the lack of specific policy guidance makes voluntary remedies a guessing game.” All companies reported efforts to overcome external resistance by lobbying at the national level and 88 percent also lobby at the state level.

Companies often worked closely with business partners on climate-related activities as well. For example, Whirlpool worked with retailers (like Lowes and Sears)

and with consumers to address misconceptions about the efficacy of energy-efficient appliances and to educate people about their benefits, including their average five-year payback period. Whirlpool also worked with Proctor & Gamble to ensure that detergents suitable for their more efficient machines were available and to educate consumers on their use. Finally, the company was pivotal in convincing *Consumer Reports* magazine to include energy efficiency in its appliance rankings.

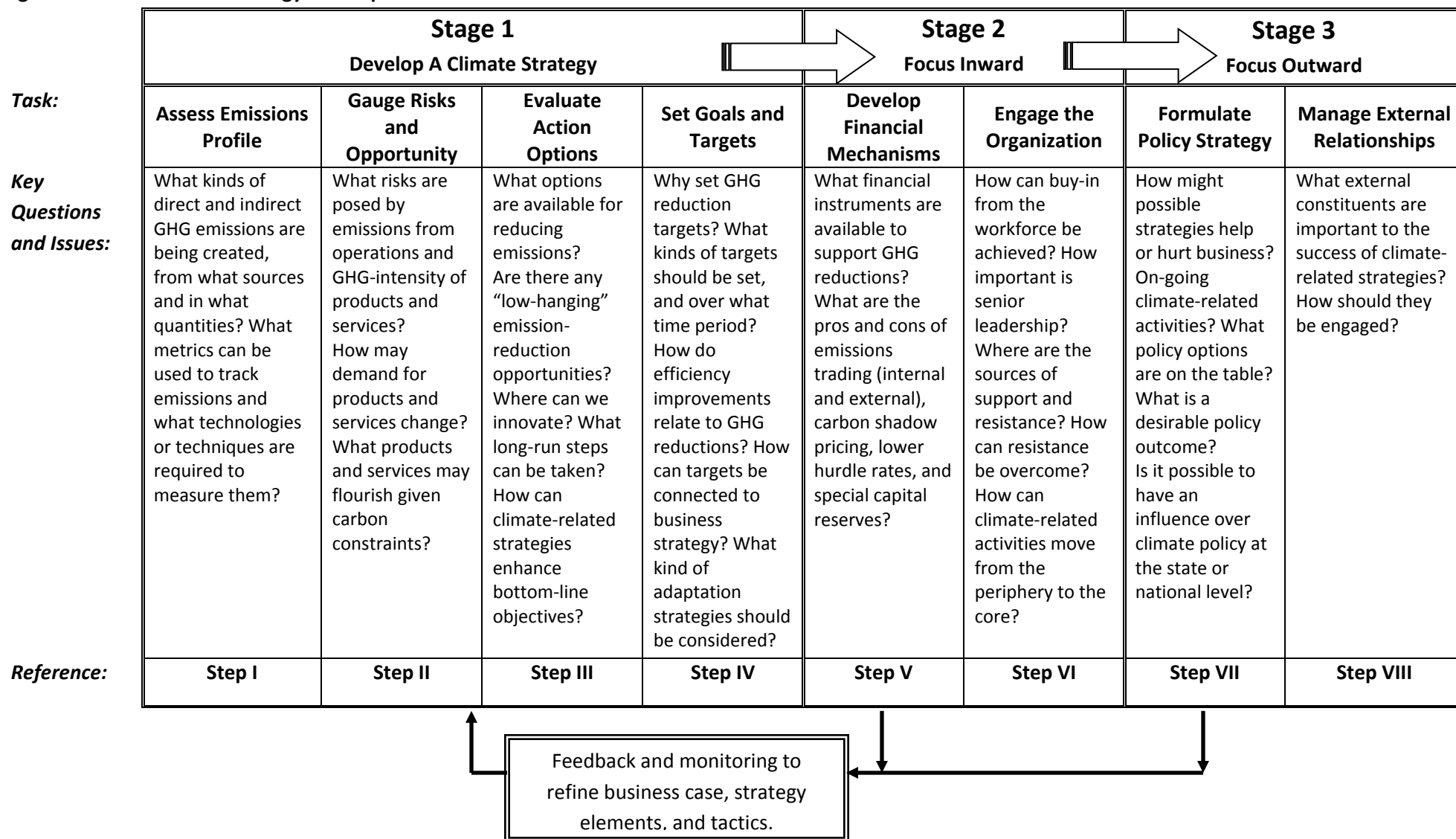
Conclusions

Just as the first rumblings of the slavery abolition movement signaled major changes in the social and market institutions of the 18th century, climate change considerations today are beginning to alter the social and market institutions in the 21st century. For business, the rules of the game are changing and companies are finding that the implications for these changes have deep cultural significance for their organizational purpose and objectives. For example, Duke Energy CEO Jim Rogers stated that, “I worry that we are using 100 year-old technology. There will be a transformative technology. At what point will our generation and transmission lines become obsolete? There are a lot of things you might do, if you think there will be a new technology in 25 years. You need to hit your numbers with a short-term view, but you need to run your company with a long-term view.” Shell’s Hone had similar thoughts. “The key is both influencing the rules of the game and timing your shift to a new carbon-constrained strategy. It’s knowing what the next technology for energy production is, and shifting when the market is ready to reward it. We’re not going to get out of the oil business in the near term.” But, Hone says, you have to ask, “What is the iPod® for energy? Is it out there? You have to be on watch.”

But as we search for iPod®-type solutions to climate change, we need to look beyond the technological and economic silver bullet. We need to look to all parts of the organization for change, and seek that change in the culture and values of the employees. This is not news to any professor who teaches organizational behavior (OB) within a business school. OB is often the least sought after class among MBAs and the

most sought after course among executives. MBAs think that they merely have to come up with the right idea and they are done. Executives realize that they also must convince people that it is the right idea and then convince them to do it. Jeff Pfeffer points out that we spend 10% of our time making decisions and we spend 90% of our time making them the right decisions. No solution to climate change will ever be found if we do not spend time changing the culture and values by which we make and implement our decisions.

Table 1
Stages of Climate-Related Strategy Development



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Biography

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